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## A Theoretical Basis for Estimating Quality of Life

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Classical economic as well as behavioural theory is founded on the principle of choice. On the basis of the axioms of ordinal utility theory, economists have been concerned with modelling "economic man", while behaviourists have been occupied with modelling "real man". Both have aimed at enriching their models with preference data, i.e. sets of data that are objective and value-free and therefore appropriate as a basis for generating the results of analyses.

Founded on the premise of preference, elaborated and hierarchically organized societies have been built up to guarantee human dignity, economic growth, and justice in the distribution of goods and services. Within the Western welfare states, various kinds of components have been built in. The dominating one is, according to Sjöberg, Vaughan, and Williams (1984, p 441), bureaucracy, which has generated the "major moral problems of our time". Socioeconomic argumentation behind bureaucracy reflects a concern with the organization of welfare and a preservation of or possible rise, in the standards of living for significant segments of their populations. The premise underlying such a striving may be either "growth" or "dignity". If growth is the major driving force, it is assumed that a particular individual can acquire economic prosperity through education. In this case, the concept of justice is equated with the concept of "equality of opportunity". The second case is concerned with education as a means for achieving autonomy, which requires a rise in the "equality of access" to education. Considered this way, the second principle has direct and constructive implication for theories of civilization, justice, and policy formation.

Respecting humans' preferences is the principle of economic growth. But there is little hope that this principle or the principle of rationality put cooperative action of autonomous individuals into perspective. Theories based on these two principles stress efficacy and rationality, and have as their result a competitive behaviour. Competition for economic profit generates numerous interlocking mechanisms, and this is reflected in the advanced bureaucracies of the in-



dustrialized world. The interlocking is the central mechanism for the encapsulation of man and man's sacrifice of dignity.

### *The Conditions of Experimental Study*

Two themes run through the introductory discussion. One is simply that respecting people's choice cannot be considered equal with respecting people (Goodin, 1981). Thus, the creation of advanced technological organizations has as its consequence not only environmental pollution but a deterioration of dignity. The second is that there are limits to physical and human resources, which cannot be resolved on the basis of rational choice alone. It is not enough to solve the problems identified on the basis of scientific knowledge. It is far more significant to study the individuals' way of stating their preferences within a given frame of reference.

The studies which will be summarized in the following are two experiments in which the same choice object elicited unexpected differences in preference ratings with respect to the framing of the choice object (Bierschenk, 1987; Bierschenk, Helmersson, & Lohmander, 1987). The choice object in both studies is the subject's own person. The subject's task was to rate its certainty of being able to live in alternative future societies, constituted by projected new forms of social organization.

### *The Theoretical Bases of New Forms of Organization*

The idea of projecting new forms of organization grew out of a symposium entitled "The Ways of Mankind - Exploring Human Sciences", which in 1972 was hosted by the Biological Sciences Curriculum Study of Boulder in cooperation with King Screen Productions of Seattle. The response to the symposium provided for the production of a series of audiovisual materials, "Projections for the Future". Within the context of this series, three major scenarios are explored: the (1) *behaviour* (2) *humanist*, and (3) *growth* models. Each of these emphasizes one scientific concept: (1) *behaviour modification*, (2) *evolution*, and (3) *cybernetics*.

### *The Behavioural Components*

The first scenario illustrates how a social system may work as the community attempts to rehabilitate and integrate a young man being

rescued from undernourishment and having amnesia. This scenario is based on the design described in Skinner's "Walden Two".

The second scenario shows a society where cultural changes have occurred and pictures a community being optimistic about these changes. Nature and human dignity are of highest value. It is focused on a young man who gets to know himself and his environment. The pursuit of knowledge and the appropriate use of technology are the keys to management of natural resources and development of life-styles.

The third scenario opens with a sunrise over a city, symbolizing a society in continuous growth. Both population and technology are in focus. A young man together with his wife is presented. Through his involvement in various events, some of the ramifications of continued growth are portrayed. The consequences of failing control mechanisms are illustrated in that things happen to the man on his way to the city.

It is these three scenarios that have been studied experimentally. The basic idea of carrying out the experiments is that a behavioural component cannot be built independent of theories of behaviour.

### *Theoretical Anchorage*

I shall assume that many different theories exist within the behavioural sciences but that they are all based on one of the following three paradigms: (1) *association*, (2) *structure*, and (3) *process*. Their operationalization has resulted in three factorized scales. The details of this study have been reported in Bierschenk (1978). As a first measure, the scenarios were assessed on the basis of these scales. A panel of five behavioural scientists were used with the aim to establish the relationships between paradigm and model society.

It could be expected that any of the paradigms is naturally too limited by itself to form the theoretical basis for a behavioural explanation of all interdependencies visualized in a scenario. But to make it possible to study in a systematic way to what extent a relation between a particular paradigm and a specified scenario exists, the proportion of variance which can be attributed to a certain paradigm was investigated. In accordance with recent trends in data-analytic statistics (Nelson, Rosenthal, & Rosnow, 1986), power analysis (Cohen, 1969), and effect size estimation procedures (Hays, 1973; Cooley & Lohnes, 1971), the "effect size" (ES) is used to indicate the degree to which the phenomenon under study is manifested. Thus, ES is some specific non-zero value in the population. The total strength



of the association between the models and paradigms was indexed by Hays' omega squared, as shown in Table 1.

**Table 1**  
*Proportion of Predicted Variance:  
Estimated with Hays' Omega Squared*

Model	Paradigm		
	1	2	3
Behaviour	.49	.39	.16
Humanist	.42	.63	.30
Growth	.77	.00	.00

*Note.* Paradigm (1) Association, (2) Structure, (3) Process

The estimated proportions of predicted variance, as reflected in Table 1, have to satisfy the reliability criterion ( $ES = > .50$ ) expected for objective measurement (Cohen, 1969). Thus a reliable relation is manifested between the *growth* model and the *association* paradigm as well as between the *humanist* model and the *structure* paradigm. Here the ambitions of the producers were fulfilled. On the other hand, the model builders have been less successful in incorporating S-R relations as building blocks. Nevertheless, the *behaviour* model will be retained in the analysis, since the strength of the relationship between model and paradigm lies at the lower bound of the reliability criterion.

### Measurement and Result

The purpose of constructing measures of the concepts (1) *quality of life* and (2) *dignity* were to assess the possibility of self-actualization and the constraints on life within each of the simulated social organizations. The common approach to this objective within the behavioural sciences requires the definition of a population and a procedure for sampling. Conventionally, a zero hypothesis is formulated and the critical level to detect the presence of real differences is set at the .05

significance level. However, this approach rarely reflects the actual procedures within experimental design (Dar, 1987). Rozeboom strongly argues against the formal procedure of hypothesis testing and concludes: "In fact, the reader may well feel undisturbed by the charges raised here against the traditional null hypothesis decision procedure because, without perhaps realizing it, he has never taken the method seriously anyway." (Rozeboom, 1960, p 424). Whether or not real differences can be established between the centroids of the model is the issue of concern in the following discussion. Based on generalized eta squared (Cooley & Lohnes, 1971, p 248) as the measure of strength of evidence, this measure will now be summarized for the potential predictor variables.

The potential predictors of the first experiment were derived by a factor analytic study of 51 statements based on  $N = 271$  subjects. The extracted scales are (1) *adaptability-security*, (2) *freedom of action*, and (3) *physical existence*. The predictors of the second study were derived from a factor analytic evaluation of 49 statements based on  $N = 180$  subjects. Two predictors were clearly discernable, (1) *self-actualization* and (2) *rank*. The location of the models in a multidimensional measuring space requires discriminant analysis. The design of the first study, because of its complexity, was evaluated by means of a factorial discriminant analysis (Cooley & Lohnes, 1971).

The first hypothesis to be studied with a multivariate generalization of the analysis of variance is whether group differences exist with respect to the localization of the groups in the multidimensional measuring space specified by the three factorized scales. The hypothesis may be formulated:  $H_1$ : *The population has a common dispersion  $\Delta$ , i.e. the dispersion matrices of the groups do not differ from each other*. The central research question however is associated with  $H_2$ : *The test vector discriminates between the models*. Both hypotheses will not be evaluated on the basis of the results reported in Table 2.

Without intending any necessary implication of causality, it is convenient to use the generalized eta squared ( $1-\Lambda$ ) to indicate the degree to which the phenomenon under the stated hypotheses is manifested. As is shown in Table 2, the interaction and group effects have negligible non-zero values. Thus the first hypothesis which is critical to multivariate theory, can be accepted. This simplifies the discussion. The second hypothesis is also accepted because of the reliable ES associated with the discriminant functions for the models.

For a discussion of this result, a further step is required, namely to give some intuitively meaningful interpretation of the derived dimensions along which the models were found to differ. In this attempt it is not only useful to examine the standardized discriminant



weights on each of the discriminant functions but also to see whether the canonical correlation squared as a measure of ES meets the stipulated criterion. The results show that only the first function is worth further consideration. The relative contribution of the three original scales to model differentiation shows that only two have the same relative importance. What this function seems to express is *affluence* with an implication of social and economic security.

Table 2

*Factorial Discriminant Analysis for 3 Factorized Scales, 4 Models, 6 Groups, and 20 Replications*

Effect	Wilks' Lamda	DF <sub>1</sub>	DF <sub>2</sub>	F	Significance Level
Model	.33	9	1153	73.74	< .000
Group	.91	15	1302	2.86	< .001
Interaction	.82	45	1373	1.38	> .05
<i>Model Effects</i>					
<i>Factor Pattern</i>		Discriminant Functions			
		1	2	3	
Adaptability - Security		.93	-.36	.09	
Freedom of Action		.87	.40	.31	
Physical Existence		.54	-.42	.73	
Relative Percentage		63.52	15.60	21.34	
Canonical Correlation Squared		.55	.27	.005	
<i>Centroids</i>					
Behaviour		.64	-.73	.03	
Humanist		-.76	.22	.09	
Growth		.81	.66	.02	
Sweden		-.69	-.15	-.10	

A closer look at the centroids reveals that the *growth* and *behaviour* models are placed at the upper part of the positive pole of the first function. The negative pole of this function is occupied by the

*humanist* model and Sweden. The Swedish way of creating a welfare state has become known as "the Swedish model". In the strict sense of model as defined above, Sweden does not qualify as a model. On the other hand, there are some model-like components, (1) the idea of a "strong society", represented by a mighty public sector, (2) institutionalization of all kinds of activity, and (3) laws granting the community the right of the guardianship of children, which make the Swedish model function as a point of reference.

Because of its simpler design, the second experiment could be analyzed with the discriminant analysis program of SPSS (1975). The results are summarized in Table 3.

Table 3

*Discriminant Analysis for 2 Factorized Scales, 4 models, and 45 Replications*

Functions Derived	Wilks' Lamda	DF	Chi Squared	Significance Level
0	.47	6	543.32	<.000
1	.78	2	175.65	<.000

#### *Discriminant Results*

<i>Factor Pattern</i>		Discriminant Functions	
		1	2
Self-actualization		1.00	.08
Rank		.09	1.00
Relative Percentage		70.71	29.29
Canonical Correlation Squared		.40	.22
<i>Centroids</i>			
Behaviour		-1.12	.08
Humanist		.41	-.87
Growth		-.35	.28
Sweden		1.06	.51



The estimated proportion of predicted variance ( $1-\Lambda$ ) for the two functions meets the reliability criterion. Thus there is enough evidence for a reliable spacing of the centroids. The factor pattern, however, shows that the strength of the relationship between *self-actualization* and the first function falls a little short of the reliability criterion. It may be concluded that the hierarchization and encapsulation of the individual is successfully achieved by the *behaviour* model, leaving no room for the development of *self-actualization*. Sweden is placed at the opposite pole of the function. This means that the strong society, as stipulated by the Swedish model, seems to have been somewhat less successful than might be apprehended.

### Discussion

The overall importance of the model differences rests on the first function of the respective analysis. Thus, *affluence* points toward unexpected differences with respect to prosperity. The two models which are conceived as prosperous and as such favourable are the *growth* and *behaviour*. The economic-technical assumptions with their emphasis on ever more efficient use of technological and human resources, as implied by the Swedish model, have not been perceived as typical of Sweden.

The *humanist* and Swedish models constitute the opposite to *affluence*. It may then be inferred that the premises of the Swedish model are of a non-materialistic kind. Since the non-materialistic assumption has been expressed by *self-actualization*, it is informative to compare the localization of the models in the second study with the first one. The results indicate that the Swedish model as well as the *humanist* model are favourably assessed with respect to the expression of self-actualization.

In conclusion, the classical definition of *quality of life* as the capacity to guarantee a growth in the standards of living is the materialistic way of conceiving society. A non-materialistic definition of quality of life would be the capacity to generate new forms of social organization in which people are respected. After all, *dignity* precedes the calculation of preferences and helps to control changes in the human context.

### Note

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### Abstract

The three basic paradigms of behaviour science, *association*, *structure*, and *process*, were used to anchor the simulation of new forms of social organization. These have been projected by means of a *behaviour*, a *humanist*, and a *growth* model. The Swedish model was also included as a possible point of reference. This article summarizes the results of two experiments, one on the assessment of *quality of life* and the other on the assessment of *dignity*. The experimental results were evaluated by means of effect size indices. The results show that the Swedish model preserves *quality of life* the least, but is best suited for a preservation of *dignity*.